

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Price Competition		5. TYPE OF REPORT & PERIOD COVERED
7. AUTHOR(s) Myron G. Myers Paul R. McClenon Harry M. Tayloe		6. PERFORMING ORG. REPORT NUMBER LMI Task RE105
9. PERFORMING ORGANIZATION NAME AND ADDRESS Logistics Management Institute, 4701 Sangamore Rd. P.O. Box 9489, Washington, D. C. 20016		8. CONTRACT OR GRANT NUMBER(s) MDA903-81-C-0166
11. CONTROLLING OFFICE NAME AND ADDRESS Deputy Under Secretary of Defense for Research and Engineering (Acquisition Management)		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE September 1982
		13. NUMBER OF PAGES 70
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) "A" Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Price Competition, DoD Procurement, Forms of Competition, Benefit/Cost Considerations, Alternative Source		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Two conditions were found to be essential for price competition in DoD acquisitions: 1) adequacy of description and 2) availability of capable, in- dependent suppliers. Absence of either condition typically requires costly action which may offset the benefits of competition. For weapon systems and subsystems where research and development must first be undertaken, opportunities for price competition must usually await reprocur- ement following initial production. However, detailed prospective analyses of (continued)		

20. Abstract (continued)

the likely benefits and costs of price competition to the Government is required. Current usable evidence for such analyses is not sufficient for development of quick and easy generalizations. Both costs and benefits are extremely sensitive to program characteristics and forecasting their values requires great care.

For other DoD procurements, opportunities for more beneficial price competition depend principally upon the adequacy of description. The costs and benefits of acquiring adequate descriptions must be assessed, or commercial in lieu of Government-unique products should be considered.

PRICE COMPETITION IN
THE DoD

September 1982

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PRICE COMPETITION IN THE DoD

EXECUTIVE SUMMARY

Competition in the marketplace is the cornerstone of the free enterprise economic system. It utilizes market forces to stimulate innovation and ensure reasonable prices; it also provides open access to the market. The Federal Government has, at least since 1809, held the conviction that competition should be employed as the basic model for Federal procurement.

The emphasis has been on price competition, whereby the setting of price and selection of source is based on the lowest offer from among a maximum number of qualified sources. The essence of price competition is a contest among capable rivals in which all terms except price are fixed and clearly defined. The benefits of this rivalry follow from the classical proposition that offered price is driven towards the minimum cost of production (including profit).

DoD policies and regulations for its 12.7 million annual procurement actions require competition to "the maximum practical extent." Even so, a great majority of DoD procurement dollars are not obligated as a result of price competition. Competition based on factors other than price can be more appropriate. In weapon systems development, design and technical factors are often more important, even when selection among competitors includes consideration of costs as one criterion among others. Source selection based on such multiple factors, however, does not constitute price competition.

The principal purpose of the study underlying this report is to identify circumstances where price competition could beneficially be employed to an extent not now achieved.

In analyzing many disparate products and services, we find no discernible relationship between their physical and functional characteristics and the feasibility of price competition. Rather, two fundamental conditions are essential for price competition. They are:

- The product or service can be described with enough precision so that potential suppliers will understand exactly what the buyer wants.
- More than one independent supplier with available know-how and facilities is willing to compete.

It is immaterial whether the procurement is for a spare part, shoes, electronic component, or a major weapon system; if these conditions are satisfied, competition is possible and likely to be beneficial. If either condition is absent, price competition can be effected only if the Government takes action to satisfy it. Whether such action is warranted depends on whether its cost is likely to be offset by the benefits of competition.

Numerous methods to satisfy these conditions are employed by the DoD. They range from acquisition of massive technical data packages resulting from full-scale development of a major system to preparation of detailed specifications for worcestershire sauce; from creation of second sources for weapon systems production to reliance on the commercial market for hand tools. The methods have widely varying costs and benefits which are difficult to anticipate. Case histories are of limited value because the benefits are highly dependent on individual program characteristics, particularly for major weapon systems and subsystems. Benefits in one program cannot necessarily be extrapolated to other programs. Case-by-case analysis is required and should be undertaken, even when quantitative data are sparse or unavailable and subjective judgment must be substituted.

An assessment of the potential for price competition can be facilitated by separating DoD products and services into the following groups:

Weapon Systems and Subsystems:

- R&D
- Initial Production
- Reprocurement

Other Procurements:

- Small Purchases (Less than \$10,000)
- Services (Except R&D)
- Government-Unique Products (Except Weapon Systems)
- Commercial Products

Our conclusions regarding the potential for increasing price competition in each of these groups are:

Weapon Systems - R&D -- Design and technical competition is appropriate for source selection. Price competition is not appropriate.

Weapon Systems - Initial Production -- This phase is essentially a continuation of development, and price competition usually is inappropriate.

Weapon Systems - Reprocurement -- This phase offers the best opportunity for price competition. Each decision requires evaluation of uncertain benefits against substantially certain costs.

Other Procurements -- Opportunities for increased price competition depend principally upon availability of adequate descriptions or acceptance of commercial in lieu of Government-unique products.

WEAPON SYSTEMS AND SUBSYSTEMS

When the DoD is seeking a new weapon system, it does not have a description adequate for price competition, nor is there a competitive market other than the one DoD pays to create. Moreover, major segments of the DoD market differ from commercial markets in many respects: the buyer directly funds the effort to develop new weapon systems, technical risks are greater than in most commercial markets, and the anticipated sales market is controlled by a single buyer. The uncertainty of the demand is aggravated by the uncertainty of the budget. Such circumstances make the value of price

competition less certain, because the cost of entry for an alternative source may offset the anticipated benefits. Nonetheless, since weapon systems and subsystems are the largest product group in terms of procurement dollars awarded noncompetitively, we must examine them more closely to identify any opportunities for meaningful increase in price competition.

Research and development, the principal means of securing a description of weapon systems and subsystems, accounted for \$10 billion in 1981. Design and technical factors rather than price are the major considerations in selecting R&D contractors. The inability to define the end product precludes the use of price competition.

The initial production phase in weapon systems acquisition is in reality a continuation of development, burdened with many of the same uncertainties and instabilities. Price competition at this stage should not usually be expected.

But after development and initial production are completed -- that is, in follow-on production -- price competition may well be advantageous. At that point it is important to ascertain the presence or absence of the two requisite conditions: adequate description and alternative sources. If either is absent, as is frequently the case, it must be created by the Government if price competition is to be realized. To create or not to create the missing condition is the critical question. Will the cost of doing so, which can be enormous, outweigh the expected benefit? That choice is difficult because the decision to incur much of the cost has to be made long before the incidence of the price competition. The groundwork -- such as use of co-development, or planning for technology transfer to a second source -- must often be laid during development of the weapon system and its subsystems. This critical question cannot be avoided or deferred without risk of losing the opportunity for price competition and thus sacrificing its benefit.

Price competition is not an end in itself; it is a technique which should be employed only when benefit is expected. Among weapon systems, a range of factors affects the usefulness of price competition. At one end of the range are market and technical risks that can be so large that the original developer or any alternative source may require Government support to establish the capability to perform or to compete. The magnitude of facilities and start-up costs may be so large that savings in recurring costs, no matter how great, may be insufficient to justify the funding of duplicate capability.

At the other end of the range are factors that allow the economic establishment of alternative sources: high production quantities, low start-up costs and readily transferable technology. Here, competitive price offers can be obtained from alternative sources and price competition is likely to prove beneficial.

Between these extremes are procurements calling for detailed analyses of the likely benefits and costs of competition to the Government. Unfortunately current usable evidence is insufficient for development of quick and easy generalizations. The danger is that conclusions from one example will be incorrectly extrapolated to programs with entirely different characteristics, and competition will be misused or opportunities for competition missed.

OTHER PROCUREMENTS

Other Procurements, which include (1) small purchases, (2) services except R&D, (3) products bought to a Government-unique description, and (4) products that are identical to or close derivatives of commercial products account for nearly all the procurement actions accomplished by the DoD.

Small purchases, consisting of a potpourri of products and services under \$10,000 in value and averaging only \$633 per procurement action in 1981,

represented over 97 percent of all actions and less than 7.5 percent of all procurement dollars. More than 36 percent of small purchase dollars were price-competed even though procurements under \$500 are not required to be competed. High administrative costs compared to award value argue against more competition in this category.

Procurements for services such as construction and transportation are highly competitive and should continue to be because both requisite conditions are satisfied. For some other services, even those of a routine nature, problems of defining performance and monitoring its quality invite unacceptable risks when source selection is based on lowest offered price.

Government-unique products, often noncompetitive because of lack or infeasibility of description, are exemplified by replacement parts procurable only from the original source. Beneficial competition can often be achieved when descriptive data and drawings are acquired. In some instances, preference for its own specifications inhibits the Government from taking advantage of commercial products available in the competitive marketplace.

Many commercial markets serve the DoD and abundant evidence shows that when the DoD enters those markets it behaves much like a prudent private buyer; its transactions are generally price competitive.

CONCLUSION

Price competition, as a procurement technique, defies explicit rules for its use. One general rule, broadly recognized in policy and regulation but often ignored, is that price competition should be used if its use is beneficial to the Government. Unfortunately, what is beneficial is often judgmental and judgments differ, even after the fact.

Procurement situations vary to such an extent that the best that can be hoped for is a policy directing the intelligent consideration of price

competition. Guidance should contain a range of examples illustrating how to decide when price competition should pay off.

Two fundamental conditions are necessary to obtain price competition: (1) availability of adequate description of the product or service to be procured and (2) availability of capable independent suppliers. Contracting officers and program managers must examine each procurement situation to determine the existence or absence of each condition.

When both conditions are present, price competition should be employed. When either condition is absent, the cost of creating that condition should be compared with the expected benefit of price competition, and the decision made accordingly. Price competition should be sought only when it can be expected to generate a net benefit to the Government.

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1. INTRODUCTION

Price competition is a procurement technique but, more than that, it is a national commitment. There is a deep-seated and historic belief, reaffirmed since 1809 in statutes, regulations and executive orders, that the model for Government procurement is solicitation of price offers from a maximum number of qualified sources. This preference has led to a tendency to evaluate performance on the basis of the overall percentage of procurement dollars obligated by means of price competition. In 1981 this evaluation was applied to a DoD universe exceeding 12.7 million separate procurement actions and accounting for over \$105 billion in obligations.

In spite of the overwhelming opinion favoring price competition, and formal commitment to its use, the Department of Defense has traditionally employed this technique for only a minor fraction (25 to 33 percent) of its procurement dollars. Many observers in the private sector and the Congress have questioned the degree to which DoD management has been faithful to the commitment. Noting the low percentage, critics are genuinely concerned that many opportunities for price competition are lost because of carelessness, indifference, or poor planning.

Before the appropriate use of price competition can be analyzed, competition in its various forms must be defined, procurement objectives identified and the defense market environment understood. The balance of this chapter addresses each of those facets.

COMPETITION DEFINED

Price competition is a contest among rival potential suppliers in which all terms except price are clearly established and defined. Source selection and the setting of the price of performance is based on the lowest offer among

those received from two or more responsible independent suppliers. In theory, the great value of price competition lies in its results of reasonable prices, optimum use of resources and unfettered access to the Government market. Those results follow from the classical proposition that market forces drive competitive prices toward the minimum costs of production (including a reasonable profit). In practical terms, within the DoD, the use of price competition is also desirable because it is more easily defended and simplifies the acquisition process for all concerned. Even apparent competition or inappropriate competition is generally a good defense against poor results. Noncompetitive procurement requires an array of time-consuming and costly management actions by the Government -- actions not required if competitive market forces can be employed.

Other forms of competition are employed. Design and technical competition is often the only form of competition available. It is not a surrogate for price competition but rather a form of competition predominantly used by the DoD in weapons development, often in conjunction with competitive cost estimates. However, source selection based on such multiple factors does not constitute price competition as defined in this report. Competition among rival weapon systems for a finite budget is apparent, albeit unmeasurable, throughout the entire acquisition process. Competition on a life cycle cost basis is often used in lieu of selection based on acquisition price alone.

PROCUREMENT OBJECTIVE

Procurement of products and services on the most favorable terms is a principal acquisition objective of the DoD. Price competition clearly satisfies this objective while providing open access to all qualified suppliers. However, there are other objectives which are sometimes higher in priority. Many are grounded in law. Socio-economic considerations are

representative, as are maintenance of an industrial base in the interest of mobilization. In some procurements, e.g., those for architect/engineer services, price competition is specifically prohibited by law.

MARKETS

The DoD is served by not just one market, but many, with little uniformity among them. Its markets run the gamut from a totally free competitive commercial market with many buyers and suppliers to a DoD-created market with one buyer and few suppliers, sometimes only one; from markets which provide many choices of product and product attributes to one in which a product exists only because the DoD has paid the price to create it.

* * * *

Some observers assert that the classification of procurement actions for reporting purposes gives a distorted picture of DoD's actual experience in using price competition intelligently and using other forms of competition appropriately. Others are critical of changes made by the DoD in its reporting conventions, believing that DoD manipulates reporting practices solely to improve its statistics.

While it was virtually impossible to avoid conclusions relative to the appropriateness or fairness in the reporting system,¹ nevertheless we have done our utmost to avoid these issues and to concentrate instead on impediments to and opportunities for real, rather than apparent, changes in the extent of price competition. Thus, our principal objective is to identify circumstances where price competition could beneficially be employed to an extent not now achieved.

¹Our observations regarding the Procurement Management Reporting System are contained in Appendix B.

2. CONDITIONS AND CATEGORIES

Products and services purchased by the DoD range from the most mundane to the most sophisticated, and in unit value from a few dollars to billions. No discernible relationship between physical and functional characteristics of such products and services and the feasibility of price competition has been identified. While it is true that certain products and services are more susceptible to price competition than others, this is not because of their characteristics. DoD does not obtain 100 percent price competition for any single category nor does it experience zero for any category.

Other objectives sometimes transcend that of price. When they come into play they must be addressed first, precluding or limiting the competition. These countervailing objectives are:

Mobilization Base: To maintain mobilization capacity and capability during peacetime, awards are sometimes allocated among two or more sources. When price competition is used, a larger share is awarded to the low price offeror, but the benefits of full price competition are diminished.

Time Urgency: DoD requirements are sometimes of such an urgent nature that it is necessary to contract with the only supplier that can comply with the delivery requirement.

Cost of Ownership: Complex operational and maintenance requirements can argue for continued acquisition of a product from an established source. Although similarly performing substitute products might be available elsewhere, the benefits of price competition would be outweighed by the high cost of duplicate operational and maintenance training and associated logistics support.

Socio-Economic Goals: The DoD sometimes restricts the nature of the competition sought and thereby the intensity of the competition obtained. Restrictions are intended to help achieve national social goals. Major programs where such restrictions are imposed are those by which contract awards are set aside for performance by small business, firms in labor surplus areas, or firms owned by designated minorities. Awards under these programs may be competitive, but the competition is within a restricted community of potential suppliers. Competitive benefits may also be constrained by wage floors placed on construction contracts by the Davis-Bacon Act and on other service contracts by the Service Contract Act. Such constraints effectively limit the extent of price competition by eliminating some potential wage differences.

Legal Prohibitions: A number of legal or regulatory prohibitions, applicable to the economy at large or sometimes specifically to the Government, affect the use of price competition by the DoD. For example, to encourage private investment in research and innovation, a firm can be granted a patent, which amounts to a limited monopoly for a new commercial product. Other examples are utility services which are regulated and architect/engineer services where price competition is forbidden.

NECESSARY CONDITIONS FOR PRICE COMPETITION

The virtues of price competition, discussed previously, are accepted almost intuitively by anyone exposed to the workings of a market economy. When present, price competition affords a type of buyer protection which is difficult to duplicate by administrative means.

Price competition in traditional markets arises when buyers and suppliers are so numerous and individually unimportant that their separate actions have no meaningful impact on market price. The product is homogeneous, undifferentiated by manufacturer, and no technical, financial or regulatory barriers exist to prevent suppliers from entering or leaving the market.

Important segments of the DoD market are different. The DoD is often the only buyer and consequently exerts complete control over market size, the timing of demand and, indeed, whether there will be a market. Products usually do not exist but instead are created at the behest of the DoD. Often the specifications change during the acquisition process. Products frequently are of the highest technology, embodying state-of-the-art know-how not commonly available. Entry into the market is not easy because technology once developed is difficult and costly to transfer. Even if technically feasible, it is financially risky because the market may not materialize as expected.

We find that price competition in the DoD market is possible and beneficial only when two necessary conditions are satisfied:

1. Adequate Description: The product or service is describable in a rigorous but not overly restrictive fashion so that potential suppliers can understand and comply with the Government's requirements.

2. Available Suppliers: The Government has access to at least two independent suppliers with technical competence and requisite facilities to satisfy the requirements.

It is immaterial whether the procurement is for a spare part, shoes, electronic component, or a major system; if these conditions are satisfied, competition is at least theoretically possible. If either condition is not satisfied, price competition is either impossible or seriously compromised. The influence of these conditions on the use of price competition is illustrated in the next few paragraphs.

The DoD spends over \$600 million annually on textiles and clothing and obtains price competition in nearly every award. While detailed Government-unique specifications are imposed, price competition is obtained because there is sufficient independent capability to conform to the specifications. Price competition is also obtained for construction contracts because adequate descriptions are available and numerous suppliers are willing to bid.

For many procurements, independent capability to supply is present but description is lacking. Spare parts for weapons systems are a common example. The DoD may not possess drawings and technical data, may possess obsolete data which do not reflect the latest design change, or may possess only part numbers of the original manufacturer. Description may also be overly restrictive for price competition. As an example, the Army once sought special purpose rail flat cars specified by a detailed military description. No offers were received until the specification was modified to conform more closely to railroad industry standards.

The Government may possess adequate product descriptions but face a non-existent or declining industrial capability. Replacement vacuum tubes were at one time competitively procured, but a declining commercial market has left the DoD with few, and in some cases no, suppliers. Future procurement

quantities and frequencies are uncertain and maintenance of a competitive production capability is unlikely.

Finally, there are instances when neither description nor capability exists and each must be created and paid for directly or indirectly by the Government. The research and development phase of a weapon system acquisition is for the purpose of creating a description of a product to meet mission performance criteria.

Even with a set of drawings and specifications the DoD cannot always go to the market and anticipate that the low bidder will be able to meet quality, quantity and performance requirements. Therefore, the designer is usually selected to be the initial producer. Competition for subsequent production quantities requires an expensive process of nurturing a second source with educational buys, duplicate tooling and test equipment, and perhaps other facilities and technical support.

The introduction of a second source to permit competitive repurchase has met with both success and failure depending upon program circumstances and conditions. Net savings, after deducting the cost of establishing a second source, for high volume missiles and components such as the U.S. Army's SHILLELAGH, TOW and DRAGON have been claimed. Published reports on other programs where conditions appeared suitable for beneficial competition concluded that the expected benefits were not realized. For example, net savings were not reported for the Mark 46 Torpedo, the Sidewinder Missile or the ARC-131 radio. In other programs, such as the AN/UPM-98 radar test sets and AN/ARC-131 radio sets, the selected alternative source failed to perform.¹

¹Further discussion of published reports relative to the savings from competition is contained in Appendix A.

Numerous methods to satisfy the conditions required for price competition are employed in varying degrees by the DoD. They range from acquisition of massive technical data packages resulting from full-scale development or initial production of a major weapon system, to use of detailed specifications for worcestershire sauce; from use of parallel development or second sources for weapon systems to reliance on the commercial market for hand tools. Most are capable of satisfying the conditions required to compete. A principal issue is the difficulty of quantifying the anticipated costs and particularly the benefits. Regardless of the difficulty, it is imperative that benefits and costs be examined on a case-by-case basis, even when quantitative data are unavailable and subjective judgment must be substituted.

PROCUREMENT GROUPS AND CATEGORIES

Our extensive examination of products and services procured by DoD and their susceptibility to competitive procurement has led us to a logical grouping of this disparate universe. For our purposes, all products and services purchased by DoD fall into one of two major groups. The groups represent procurement situations rather than physical or functional characteristics. They are: (1) Weapon Systems and Subsystems and (2) Other Procurements. Weapon systems and subsystems can be subdivided into: research and development, initial production, and reprocurement. Other Procurements can be subdivided into: small purchases less than \$10,000 (now \$25,000), services (other than R&D), Government-unique products (other than major systems), and commercial products.

3. WEAPON SYSTEMS AND SUBSYSTEMS

Weapon systems and subsystems pose the greatest challenge and offer the highest potential to the DoD in use of price competition. Virtually all weapon systems, subsystems and major components at their inception lack at least one of the two conditions required for price competition: there is no adequate description of the product sought. To overcome this disability the Government sponsors research and development to create that description.

Although the following discussion separates weapon systems and subsystems into three categories (research and development, initial production and procurement), those categories are not sharply identified or mutually exclusive. Actually, weapon systems acquisition is a continuum. Initial production is in reality a continuation of full-scale development, burdened with many of the same uncertainties and instability. In fact, the DoD concept for Pre-planned Product Improvement (P³I) tends to institutionalize the dynamic characteristics of weapon systems by extending product improvement activities far into the operational life of the system. Nevertheless, the three categories provide a convenient way to assess the potential for price competition within the context of the two requisite conditions.

RESEARCH AND DEVELOPMENT

The DoD spends more than 10 percent of its annual procurement funds for R&D contracts, generally without price competition. A significant feature of the relationship between the DoD and its industrial suppliers is the fact that most weapons systems and subsystems must be developed under projects which are funded directly by the DoD. This situation results primarily from the fact that the DoD is expected to be the only or dominant buyer of the developed

systems. In fact, the cost of contractor-funded development can be recouped only through advance agreements between the DoD and the contractor.

It has long been recognized that the nature of R&D precludes source selection based on the lowest offered price. The uncertainty of the effort required to formulate and design high technology products argues that the Government rather than the private sector ought to bear the related risks. Otherwise contract prices would have to cover contingencies for those risks. For this reason, contracting is usually on a cost-reimbursement basis which precludes price competition. Furthermore, the object of the R&D effort is to seek the most advanced scientific knowledge attainable and the best military products. Hence, source selection is based on technical understanding and capability. The inability to define with precision the end product of the effort and the uncertainty of its achievement prevent the use of price competition.

The fact that price competition has no place in the source selection for R&D contracts does not imply that competition by other means is not or should not be used. Parallel development is often employed during the R&D process and typically culminates in the selection of a contractor for full-scale development and initial production. Parallel development affords a valuable type of competition among concepts, ideas and solutions. Its value is that it allows for competition based on technical merit and reduces the risk of program failure through the maintenance of alternative approaches. We have encountered situations where maintenance of parallel efforts through full-scale development prevented premature selection of the "wrong" contractor. A critical issue is how far into the development process the parallel, duplicate, competing development efforts should be funded. Budget limitations, however, often constrain the use of parallel development, especially for large programs where it simply is unaffordable.

INITIAL PRODUCTION

Acquisition policy for weapons systems calls for competition among alternative designs in early concept formulation and the maintenance of this technical competition in later development phases as long as economically practical. When a single producer is to be selected prior to completion of full-scale development, price competition for initial production is infeasible since estimates of price would be for an item not yet fully designed. When competitive development efforts are maintained, even through prototype development, the potential for price competition of initial production quantities is generally not greatly enhanced. Inability to obtain price competition following parallel full-scale development stems from two problems. First, the designs may be so unstable that price competition lacks meaning; price offers are for what is described rather than what will actually be produced. Second, priced offers are for products with differing performance characteristics so that price alone cannot become the basis for selection.

In instances when the design is incomplete, the requisite condition of adequate description is not satisfied and price competition must await reprocurement. In cases where description is adequate, a number of techniques are possible to establish a capable alternative source. Some techniques are well established, such as purchase of technical data packages and technology transfer through learning buys. Others, such as co-development and separation of design from production, are experimental or untried. None is without cost to the DoD and none can be employed without risk or other drawbacks.

Technical Data Packages

It is the DoD's policy to acquire from developers technical data sufficient to enable others to manufacture complete end items or components developed at DoD's expense. Such data are beyond the detail needed for maintenance and repair of systems and include manufacturing process descriptions.

Technical data, when complete, usable and up-to-date, can, in theory, allow for price competition in initial production, follow-on production quantities or reprocurment of spare parts. However, significant modifications and engineering changes are often undertaken concurrent with initial production. For this reason acquisition of technical data from the developer is of questionable value for price competition at the stage of initial production. If data packages include drawings and do not include process descriptions, they may be virtually useless to any firm other than the developer. If the designer-developer planned for production in a specific shop, the data package may be difficult to adapt to a different production situation.

Co-Development

Co-development is a technique now being used in the acquisition of a joint Air Force-Navy subsystem, the Airborne Self-Protection Jammer. It is intended to enable the DoD to use price competition for production between two suppliers who jointly developed the subsystem and demonstrated production capability. The co-developers were selected through technical competition among several rival teams.

This approach is intended to ameliorate the technical transfer problem between a single developer and a second production source and to reduce the time required to establish a second source. The program has not entered the competitive production phase and its success cannot yet be evaluated. However, its usefulness cannot be achieved without some costs. Contractor and Government costs for development are bound to be greater than in using a single developer, since coordination during development is a difficult (and costly) task. Further, co-development does not mean joint development in total; drawings and data have to be exchanged in accordance with assigned responsibility. Finally, each member of the co-development team

must demonstrate its ability to qualify and produce the item developed. This inevitably implies duplicate start-up investment costs and, depending on quantities bought, excess costs for duplicate learning buys. Co-development promises to be most beneficial when technical transfer is readily achieved, interface problems among subassemblies are minimal, incremental start-up costs for production are low and production quantities are high. Procurements of subsystems bought in substantial quantities are most likely to benefit from this technique.

Separate Development From Production

Price competition for initial production of weapon systems and subsystems is severely limited under current procurement methods. To obtain more price competition would require a major change; namely, separation of design and development contractors from production contractors. This means that the contractor selected for design and development would be prohibited from competing for production. Such separation of responsibility is the practice in most construction and shipbuilding.

Adoption of this practice would likely result in creation of some firms that specialize in design and others in production. The developer would be required to provide a technical data package adequate for use by others in production. This would eliminate any present predilection by the designer to seek advantage from his incumbency. Other potential producers would price compete on an essentially equal basis. One alleged benefit is that the production contractor could be a production specialist, with a minimum engineering capability and hence lower overhead costs.

There are also serious objections to this idea. The costs of technology transfer are high and must be borne somewhere. A main incentive for a firm to seek and perhaps subsidize development work is the hope for the

production contract. The DoD might have trouble getting good development contractors if acceptance meant renouncing any chance at a production contract. Many experienced engineers believe that the designer-developer should be responsible for production, and that separation may lead to a lack of producibility.

One problem about the distinction between "developers" and "producers" is that there often is a recurring need for the engineering talents of "development" firms. Those talents may not be readily available if their firms are deprived of production contracts. For example, major firms in the air conditioning industry participated with the Army several years ago in development of units rugged enough for specified military conditions. For many years now the Army has been buying air conditioners (to these specifications) under small business set-aside procedures. Small business firms assemble the units, using motors and compressors made by major firms. Little incentive now exists for the major firms to participate in a similar development project, and the existing assemblers do not usually have engineering staffs with sufficient expertise to consider the future needs of the Army. This example suggests that strict price competition for production may result in a reduced capability to develop the next generation of needed equipment.

Despite the superficial attractiveness of the proposal to separate design and production contractors, in most applications its drawbacks outweigh the likely benefits.

Summary

Generally the first production contract for a weapon system or for a complex subsystem is awarded to the developer without price competition. Competition of a technical nature is likely to have been the predominant basis for selection of the initial producer. This is especially true when, as

usually occurs under time and budget constraints, the producer is selected prior to full-scale development. Even in instances when parallel full-scale development occurs, price competition is of dubious value since dissimilar products with dissimilar performance characteristics are developed and will probably undergo further engineering change. Technical data purchased from the developer for transfer to others are inadequate for price competition at the time of initial production. The design is unlikely to be stable and a second source will usually require costly assistance and nurturing to become a viable competitor. Unproven techniques and procurement management procedures such as co-development and separation of design from production are risky and fraught with uncertain impacts.

Since prospects for price competition are not good at the time of initial production, we must look to later awards, those for reprocurement. Here the problem of design instability should be reduced, and at least the possibility of clear description exists. The major issue is the cost and benefit of actions to create qualified suppliers for price competition.

REPROCUREMENTS

Any substantial increase in the effective use of price competition will probably be in connection with reprocurement following initial production. The same two essential conditions must be considered: adequacy of description and availability of more than one potential supplier.

In connection with reprocurements of weapon systems, the more significant requisite is usually the availability of a qualified competitor. The company with the initial production contract is in a position of advantage. Often the DoD must take action if any other firm is to be able to offer real price competition.

DoD policy, expressed in DAR 3-108(b), urges small initial production contracts to the developer for the purpose of design stabilization, to be followed by price competition between the incumbent developer/producer and one or more alternative sources. DoD policy also recognizes the leader-follower procedure and purchase of complete data packages from the developer as available techniques to help establish an alternative source. In lieu of price competition for a complete end-item, subsystems and components often are broken out from the prime contractor and their production separately competed.

Benefits and Costs

Competition for follow-on production quantities is primarily an economic investment decision to be evaluated from the viewpoint of the Government. Benefits in terms of lower acquisition costs must be compared with the costs incurred by the Government to establish a competing alternative source. It does not necessarily follow that price competition, where obtained, will always produce net benefits to the Government. The evaluation is necessarily prospective: benefits expected in terms of lower offered price and Government costs expected to be incurred to achieve these savings. Consideration must also be given to non-monetary factors, such as technical risks that quality and performance criteria cannot be met and that delivery schedules will be unreasonably compromised. To be in a position to conduct an economic evaluation of competitive procurement, benefits and costs must first be defined and then quantified. Both definition and quantification are so situation-specific that no one formula or savings percentage can be used universally.

Competitive benefits occur when the Government receives from a qualified producer a lower price offer than otherwise would have been obtained from the incumbent supplier. This is possible when a competing supplier

(1) obtains necessary resources at lower prices, (2) produces with fewer resources, or (3) accepts lower profit. Benefits can also occur when an incumbent reduces his offer, under the threat of competition, by any of the same means.

A competitive price offer must be sufficient for the offeror to expect to recover, over the program's life: (1) costs that are nonrecurring or start-up in nature, (2) costs that recur with production volumes, and (3) an acceptable profit. Benefits and costs are extremely sensitive to the particular procurement and are inevitably probabilistic since they depend on such uncertain factors as suppliers' perception of technical risks and eventual market size, and the extent to which excess costs are present in the incumbent's price. The probable competitive saving is a function of program characteristics -- principally the relative size of recurring and nonrecurring costs, anticipated production volumes prior to and after the introduction of competition, and the type of item being procured.

Attempts to use prior evidence of savings achieved from competitive reprocurments to guide future competitive decisions are only appropriate when such evidence is adjusted for the characteristics that influence the level of savings achieved. In most instances, absence of adequate data precludes such an evaluation. Appendix A provides a more detailed discussion of the factors which must be considered and an analysis of a number of prior publications on this subject.

The following situations of benefit/cost evaluations illustrate the range which can be encountered in reprocurement.

Situation 1. For relatively uncomplicated technologies when the Government possesses an adequate data package (description) and when production capability is largely extant, the Government can go to the market and

solicit alternative price offers. Procurements of this type may include ammunition components, simple spare parts and relatively simple electronics.

Competitive price offers will reflect the amortization of any non-recurring costs over anticipated production quantities. Recurring cost savings and lower profit must offset nonrecurring costs in order to obtain a lower price offer. The Government must weigh its costs of competition against any anticipated benefits. Government costs include the costs of acquiring descriptive data if not available, losers' bid and proposal costs (included as overhead on other DoD contracts) and Government administrative costs for RFP preparation and evaluation of offers. Non-monetary risks must also be considered.

For this low technology, existing capability situation, there is some useful evidence on the extent of savings from price competition to guide future evaluations. A 1979 Army Procurement Research Office (APRO) study covering 22 competitive Army reprocurements of bombs, fuzes, projectiles and related items found recurring cost savings ranging from 3.7 to 10 percent depending on assumptions of what the noncompetitive cost would have been. Use of anticipated recurring cost savings in this range is, however, just one part of the analysis. A full benefit/cost analysis would require consideration of (1) estimates of contractors' nonrecurring cost and quantities to determine per-unit prices related to amortization and (2) Government costs for competition consisting of data acquisition, losers' bid and proposal costs and Government administrative costs.

A 1981 APRO study is also useful. For 26 very low value, high volume, helicopter spare parts bought frequently by the Army Troop Support and Aviation Readiness Command, unit price savings in the range of 15 to 25 percent were found. Since those results do not separate recurring from

nonrecurring costs and profit, they are only useful for estimating savings for similar procurements; i.e., low value items (ranging from a few to several hundred dollars) procured in high volumes. To complete the analysis, it would be necessary to deduct the Government costs of competition from gross savings to derive anticipated net benefits from competition.

Situation 2. This situation deals with reprocurements that are much more typical of the DoD environment -- sophisticated weapons systems for which the DoD cannot merely go to the open market with drawings and specifications and obtain responsible bids. Substantial unique facilities and special equipment are often required. Some initial production is usually necessary to qualify an alternative source and enable it to gain enough experience to price a competitive offer realistically. It is generally unrealistic to expect competition unless the Government directly funds some or all of a contractor's start-up costs.

In this case, the benefit/cost methodology is essentially the same as in the preceding situation except that Government-funded nonrecurring start-up costs must be considered. They play no role in the competing price offers but instead are treated as Government costs to be weighed against competitive savings in the economic evaluation of competition. Costs of competition thus include, in addition to incremental costs of data, losers' bid and proposal costs and Government administrative costs, the following items: higher costs for quantities acquired during learning buys, costs of technical assistance to the competitor by the incumbent, costs of Government-provided unique tooling, special test equipment and unique

facilities, and possibly higher overhead costs on other programs when an incumbent loses a competition.¹

The total nonrecurring costs incurred directly or indirectly by the Government are subtracted from the anticipated recurring cost savings (gross savings), adjusted for the quantity of production. The result is the expected net savings attributable to the introduction of competition.

There is a multitude of relatively recent studies undertaken to quantify the extent of savings from competition. Many of them cover repro- curements of the type considered here and seek to take advantage of available evidence to forecast savings on future, perhaps dissimilar, programs. Those studies should be used only with great caution. In many cases faulty methodologies or data deficiencies diminish their usefulness. In other instances their findings are applicable only to new programs or awards with characteristics essentially the same as those of the cases from which the evidence was drawn. Because evidence has not been properly adjusted to account for program-specific characteristics, there is danger in extrapolating results to dissimilar programs. In general we support the findings of a recent Rand Corporation report, that the

"existing body of analysis has not provided an adequate set of management tools for estimating either the benefits or the costs of competitive repro- curements...." and "that much of the conventional wisdom about competitive repro- curement rests on shaky foundations, and that we may know less about competitive repro- curement than we thought we did."²

¹The one exception to this list of costs occurs when the DoD requires additional total capacity for the program. In this event the costs listed would be incurred independent of the decision to compete and cannot be ascribed to competition.

²Archibald, K.A., et al. Factors Affecting the Use of Competition in Weapon System Acquisition, Rand Corp., R-2706-DR&E, Feb. 1981. (pp. 53-54)

Situation 3. This situation deals with procurements where incremental investment costs for production are so large and total program funding so uncertain that the Government necessarily funds much of the incumbent developer/producer's start-up costs. The number of programs represented by this situation may be small, but dollar values are high. The B-1 bomber and M-1 tank are examples. Size of the investment, its uniqueness to military work, and the program's uncertainty usually imply that Government funding is the only way to attract industrial participation. Such funding may be indirect, as when the Government agrees to buy back undepreciated facilities if program cancellation prevents full recoupment of their costs. Price competition here is unlikely to be economic. It is conceivable that no matter how low an alternative source's production costs and profit, nonrecurring start-up costs would outweigh any production cost savings. No evidence of competitive reprocurement exists for programs with high incremental investment costs, such as tanks, aircraft carriers and major combat aircraft programs. Nor should any evidence be expected, precisely because these programs have characteristics that are least amenable to competitive savings. Price competition is simply not economic and alternatives that simulate or substitute for competition are the best one can hope for.

An alternative in situations where duplicate investment costs outweigh any conceivable manufacturing cost savings would be for the Government to contract for production in facilities it owns, as is now done for tanks. Such a pre-planned alternative may allow for an element of price competition, or perhaps increased leverage, where it otherwise would not exist. Production contracts at the Government facility could, under certain conditions, be successfully competed. While this proposal is a logical solution to an otherwise intractable problem, its application is severely limited in practicality.

The feasibility of a new contractor successfully taking over an existing program from an incumbent is not great when complex subcontracting arrangements are involved, when component interface is technically difficult or when several programs are concurrently in operation at the facility. The leverage of competition is diminished by the advantage of experience resident in the incumbent. Moreover, interest by potential competitors requires likelihood of long production runs over a substantial time period. This technique is rarely appropriate as a method of obtaining price competition.

Subcontract Competition and Breakout

Two major techniques are available when full competition for an entire end-item is either infeasible or uneconomic. These techniques are: 1) competition in subcontracting, and 2) explicit "breakout" of components, which are then contracted for directly and furnished to the prime contractor. Each technique can confer some of the benefits of price competition to the Government.

Most prime contractors are dependent to a large extent on their subcontractors and suppliers for various subsystems, assemblies, and components. As a result, a large portion of the price paid by DoD is in turn paid out by the prime contractor to others. Subcontracting under prime contracts ranges from about one-third of total costs for engines to over one-half for aircraft and ammunition contracts. The DoD reviews the subcontracting and purchasing policies and procedures of its prime contractors and there is reason to believe that an appreciable part of each contract is, in fact, paid out on the basis of price competition administered by the prime contractor. However, there is no reporting to the DoD of subcontract competition by prime contractors.

Competition in subcontracting can be present even though the prime award is noncompetitive. Conversely, price competitive prime contracts can involve noncompetitive subcontracts. The benefits of competitive reprocurement are reduced when the incumbent and all alternative sources must procure major subassemblies and components from the same (sole-source) subcontractor.

When competition is present in subcontracts, do its benefits flow through to the DoD? The answer is clearly yes when prime awards are subject to real price competition and also when contracting is on a (noncompetitive) cost reimbursement basis. Further, noncompetitive fixed-price contracts typically require that the contractor certify and substantiate his estimated subcontract and purchased materials costs. However, any unanticipated benefits of competition subsequent to negotiated contract award do not necessarily flow through to the Government.

During initial production, the prime contractor is responsible for making or acquiring most of the subsystems and components. By the time of reprocurement, the DoD can consider the direct purchase of selected (usually high-cost) items for delivery as Government-furnished equipment to the prime contractor for installation in the weapons system. Such "breakout" is another technique to obtain price competition for a share of the system when it is recognized that the prime contract will not be price competitive.

The justification of breakout must give consideration to hidden costs. The DoD, in exchange for competitive savings, assumes a responsibility which would otherwise be with the prime contractor, responsibility for coordination of delivery timing with production requirements and responsibility for quality control and acceptance inspection. It also must assume a complete set of contract costs for acquisition and administration.

Every issue which must be considered in connection with reprocurement of an entire weapon system must be considered with initial DoD procurement of a "breakout" item. The same kind of analysis of expected benefits and costs should be made before making the decision to break out any component.³

Buy-Out vs. Continued Dual Sourcing

When alternative production sources exist, it is necessary to decide whether to continue them. The choices are between sharing of production quantities to maintain the availability of both suppliers (continued dual sourcing) or a single one-time competition for the remaining anticipated requirement (program buy-out). The preference for one or the other strategy depends on the circumstances of the procurement -- neither strategy is preferred all the time.

A one-time competitive buy-out has the advantage that the entire known quantity is subject to price competition. A further advantage is that duplicate investment costs, to the extent not already incurred, can be avoided. A buy-out strategy is appropriate when the total required quantity is known at the time of the competition. Otherwise, a noncompetitive situation might arise if additional quantities are ever required, because the losing competitor is likely to leave the market.

When the total program requirement is uncertain, the strategy of continued dual sourcing to maintain both suppliers is preferred. This strategy, by definition, limits the benefits of price competition. The excess price for quantities awarded to the high-priced bidder represents the cost paid to maintain a capability for future competition. Consequently, as soon as program quantities are known, a buy-out is preferred.

³Comprehensive guidance to this effect has recently been proposed as DAR Supplement No. 6, "Replenishment Parts Breakout Program."

Summary

The forces which motivate competitors to seek better methods of production -- in order to be able to offer lower prices and still earn profits -- are desirable for procurement of weapon systems and their components. If these forces can be brought to bear, the DoD can benefit. Our analysis has shown, however, that explicit DoD action is often needed before price competition can be made available. That action could be to acquire and provide adequate description. More often it would be to create facilities, provide training, and effect technology transfer for startup of a qualified production capability. The costs could be enormous, requiring expectation of huge benefits to justify their expenditure.

4. OTHER PROCUREMENTS

The remainder of DoD acquisitions consists of small purchases, awards for services other than R&D, items bought to a Government-unique description and commercial products. In total, these purchases represent most of the DoD's procurement actions, but fewer noncompetitive dollars than weapon systems and subsystems. The dividing lines among the categories are not sharp. Ambiguity is especially present between "Government-unique" and "commercial" items. Some of the purchases are related to or in support of weapon systems.

The appropriateness of price competition depends largely, but not exclusively, upon the availability, adequacy and suitability of description. Securing or altering descriptions is often necessary to create or intensify price competition. The following sections address the satisfaction of the requisite conditions for price competition for the four procurement categories cited above.

SMALL PURCHASES

This category is defined by its separate reporting treatment and by the fact that special rules designed to minimize procurement administrative costs apply.¹ In principle, all types of products and services acquired by the DoD can appear in this category. Most DoD procurement actions (over 97 percent) occur here but, with an average award size of only \$633 in fiscal year 1981, the category accounted for less than 7.5 percent of total award dollars. In recognition of the magnitude of the administrative costs associated with small dollar actions and the minor benefits likely to be realized, it has long been

¹Congress recently approved raising the threshold defining small purchases from \$10,000 to \$25,000.

policy to exempt awards under \$500 from the requirement for price competition. Over 36 percent of small purchase dollars were price competed in 1981 even though procurements under \$500 are exempted.

Any change increasing the administrative costs for this huge workload would be unlikely to produce concomitant savings.

SERVICES (OTHER THAN R&D)

Diverse services have diverse rates of price competition. In total, over \$20 billion of awards are made each year in this category. The potential for and extent of price competition realized is principally, but not exclusively, linked to the requirement for adequate description -- the end product cannot always be described with the precision necessary for price to be the only source selection criterion. For description to be adequate, it is often necessary that it include quality standards to which adherence can be defined and monitored.

The DoD achieves high rates of price competition for those services which can be rigorously described. Examples are construction, real property maintenance, and transportation and travel. Lower rates of price competition are obtained for other services. Competition is not possible for regulated utilities; it is forbidden for architect/engineer services. Engineering and technical services and the maintenance and modification of equipment can usually be accomplished only by the original manufacturer, who is familiar with the engineering and component interface problems and possesses the unique test equipment designed during the original production phase. For services of a technical or management nature or even routine housekeeping, the problem of description and especially quality adherence often arises. Price competition can lead to reduced quality of performance when standards are difficult to define and monitor. Competition for the management or operation of Government

facilities, although feasible, offers little benefit when most of the effort is for labor services subject to wage floors mandated by the Service Contract Act.

Alternative sources of supply for services generally exist, except perhaps for maintenance and modification of equipment and engineering services. Nonetheless, price competition cannot routinely be prescribed. It is a risky course unless clear standards of performance are available, or unless the Government can tolerate the possibility of lower quality.

GOVERNMENT-UNIQUE PRODUCTS

Government-unique products are those bought to a Government description which differs from a commercial standard or from readily available products. The inability to employ price competition can arise from failure of either of the two requisite conditions. In some instances, especially replacement parts for military end items, the DoD may not have adequate description, such as detailed drawings and process descriptions, and can only procure the item from the original manufacturer. In other instances, potential suppliers may view conformance to the Government requirement as too difficult or may find market entry economically unattractive for what may represent small quantity buys.

A unique Government description does not, however, preclude price competition. For example, a unique military jet fuel was procured in 1980 with intense price competition because of excess refining capacity.

The preference for its own specifications sometimes inhibits the Government from taking full advantage of an available competitive marketplace. Although the DoD is one of literally millions of buyers for subsistence items such as coffee, meat products, and condiments, its preference for a unique product and insistence upon inspections during production sometimes preclude the acceptance of commercial items. Established commercial producers find it

too costly to disrupt normal manufacturing processes to conform to Government specifications for what amounts to a small fraction of their annual production; as a result the Government's needs are supplied by specialty firms who sell principally to the Government.

Replacement parts for military equipment present a significant problem in terms of dollars expended and difficulties encountered. Deficiencies in one or both conditions for price competition can be present and the economic value to the DoD in overcoming them is uncertain and difficult to forecast. For example, vacuum tubes for older electronic equipment represent a large expenditure by the DoD (over \$200 million in 1981). The industrial base has diminished because commercial applications have been largely replaced by newer technologies. Despite adequate descriptions and much competition when the technology was current, these replacement items are now procured largely noncompetitively. Other examples are describable items which are bought so infrequently and in such small volumes that it is uneconomic for an alternative supplier to enter the market. Finally, some replacement parts could conceivably be price competed except for lack of description. Either a complete description (drawings and process description) or identification of multiple qualified vendors who originally supplied the item to the prime contractor are required for price competition to be feasible.

COMMERCIAL PRODUCTS

Commercial products are items sold in substantial quantities to buyers other than the Government. They may be distinguished by brand names, industry standards, or may have standards which have evolved in commercial practice. A competitive marketplace is understood to exist when no individual or small group of suppliers has a substantial share (control) of the total market.

The acquisition of commercial products defined by industry or commercial standards is usually accomplished by price competition. Items such as regular grade motor fuel, lumber of various shapes or forms, construction equipment, paints and varnishes, spark plugs and metal cable are bought to commercial standards.

Strict price competition is not always needed for the DoD to realize equivalent benefits. Purchases of brand-name items at market prices, perhaps with available quantity discounts, are competitive if the underlying marketplace is competitive. The Government, like any other buyer, automatically obtains the benefits of competition independent of the buying procedure used -- even simple recourse to listed catalogue prices. Similarly, a multiple award schedule, on which competing products are listed and priced and where the ultimate user is free to select among alternative brands, has all the attributes of the underlying marketplace. An added benefit of multiple-award schedules is that the user can assess price/performance tradeoffs and exercise value judgment in product selection.

5. CONCLUSIONS AND RECOMMENDATIONS

Management actions designed to increase the effective use of price competition should be based on the two essential conditions for price competition (adequate description and available suppliers) and on the procurement situation. The DoD obtains price competition when it enters commercial markets as one of many buyers because the conditions generally are satisfied. The main opportunities for more DoD price competition are when either condition is missing but action can be taken to create it. Such competition-enhancing action should be taken only when a net benefit can be expected. There is little doubt that the incidence of price competition can also be increased where the two essential conditions already exist but have failed to be recognized. Undoubtedly this happens. Management pursuit of such failures should help minimize lost opportunities for price competition.

WEAPON SYSTEMS AND SUBSYSTEMS

For weapon systems and subsystems, where most noncompetitive dollars are concentrated, the introduction of price competition requires the availability of an adequate and transferable description and the creation of an alternative production capability.

Research and development, the principal means of securing a description of weapon systems and subsystems, should continue to be procured primarily on the basis of design and technical considerations. The inability to define the end product at time of contract formation relegates cost to a secondary role.

At the time of initial production, the developer is usually the only qualified producer. Indeed, the dividing line between R&D and initial production is typically not clear. Design changes and modifications are an

inevitable occurrence in a high technology arena. For this reason, description of the desired product is usually not sufficiently stable for meaningful price competition in initial production.

For reprocurement, we urge consideration of the introduction of a competitive alternative source whenever design is stable and production quantities to be bought are fairly certain and relatively large. Such consideration is an economic investment decision weighing the expected costs of competition against likely savings. Cost categories to be included in the evaluation, as well as their magnitude, are specific to each procurement situation. The level of anticipated benefits of competition is uncertain at best. Since, in theory, benefits are sensitive to the characteristics of each procurement (recurring and non-recurring costs, and quantities bought), results from case histories must be used with caution. In many instances the best one can hope for is an estimate of required savings to justify a second source and a judgment as to whether or not such savings are realizable.

When price competition is not obtainable for the reprocurement of an entire weapon system, breakout of selected subsystems or components is a technique to obtain price competition for a portion of the reprocurement. The decision to favor breakout should be made only after a determination that the benefits are expected to exceed the costs related to the breakout.

OTHER PROCUREMENTS

DoD's Other Procurements consist of a great variety of products and services. The use of price competition is based largely on availability, adequacy and suitability of description; a lack of capable alternative suppliers is usually not a problem.

In some instances a preference for its own specification or adherence to procedures for formal advertising, which requires standardization of all

factors except price, limits the Government's access to available competitive markets for acceptable products. To increase the use of clearly beneficial competition in these cases, we recommend greater use of commercial or brand name products. This can be accomplished by eliminating detailed Government specifications and prequalifying commercially available products.

In other instances competition is limited by the infeasibility of describing the requirement. Sometimes this is a function of what is being procured. For some services the requirement cannot be described, or associated quality attributes cannot be readily specified or monitored. We urge greater attention to the tradeoff between the desire for quality of performance and the economic benefit of price competition. No explicit rules are possible; instead judgment must be exercised by contracting officials.

Often description is lacking because technical data acquired from the original developer are inadequate, incomplete or obsolete. On other occasions replacement spares are described only by the prime contractor's part number although they may have been manufactured for the prime by several subcontractors. The DoD generally acquires technical data, but personnel limitations often prevent it from determining their adequacy for subsequent competition. Where lack of adequate description prevents competition, especially for replacement spares on military items, we recommend experimenting with the addition of technical and procurement personnel dedicated to securing descriptions where they are now missing or inadequate for competition. This experiment should be evaluated to determine the costs of the additional resources and the benefits which result from the competition. This activity should be expanded and continued until it no longer confers benefits in excess of its costs. Additionally, we recommend that the DoD intensify efforts to obtain lists of alternative vendors and standard commercial components.

For acquisition of commercial products in competitive markets, we support the use of multiple-award schedules. Competing products which perform similar functions could be selected on a value basis by the user.

* * * *

Price competition, as a procurement technique, defies explicit rules for its use. Procurement situations vary to such an extent that the best that can be hoped for is a policy directing the intelligent employment of price competition. Guidance should contain a range of examples illustrating how to decide when price competition should pay off.

Two fundamental conditions are necessary to obtain price competition: (1) availability of adequate description of the product or service to be procured and (2) availability of capable independent suppliers. Contracting officers and program managers must examine each procurement situation to determine the existence or absence of each condition.

When both conditions are present, price competition should be employed. When either condition is absent, the cost of creating that condition should be compared with the expected benefit of price competition, and the decision made accordingly. Price competition should be sought only when it can be expected to generate a net benefit to the Government.

APPENDIX A

CONTEXT OF COMPETITIVE DECISION MAKING: BENEFIT-COST ANALYSIS

INTRODUCTION

The decision to introduce price competition requires a prospective evaluation of benefits expected to be received and costs expected to be incurred to determine probable net savings. Such an evaluation rests primarily on prior evidence of savings achieved when noncompetitive awards were subjected to competitive repurchase. Even if such an evaluation based on past experience is possible, it is inevitably probabilistic since it depends on such uncertain factors as suppliers' perception of technical and market risks and the extent to which excess costs are present in the incumbent's pricing.

The ground rules for an evaluation of competition also require a definition of what benefits and especially what costs are to be included. By way of illustration, there are some costs for competition associated with a particular award which may instead have an impact on overhead in other DoD programs. There may even be costs which do not affect the DoD budget but which are borne by the private sector, such as those for redundant unique facilities funded by an incumbent contractor who subsequently loses a competition. Benefits beyond savings in program costs are also possible when, for example, a new technology or design developed in a competitive DoD environment has application in another DoD program or in commercial markets.

METHODOLOGICAL ISSUES

A methodology is needed to assist in the prospective evaluation of whether or not competition is likely, on balance, to confer beneficial results. It is necessary to employ quantifiable results from case histories

where competition has been introduced for this purpose. We ask what types of historic data, in what format, are required so that reliable estimates can be useful for projections. Particular attention must be focused on the usefulness of applying case histories of competition with their particular characteristics to new competitions, perhaps with very different characteristics.

First, consider the elements involved in the determination of a price offer. In general, a supplier incurs three broad types of costs which must be recovered in the price received. These costs are:

1. Non-recurring incremental start-up costs to be amortized over the firm's expected future volume in the program. These costs may be facilities-related or may be for items like process engineering manpower, but are associated uniquely with the program as a whole.
2. Recurring per-unit costs such as production labor, materials and overhead which vary with quantity produced.
3. Profit

The introduction of price competition is for the purpose of obtaining a lower price offer than would otherwise be obtained from the incumbent. This may occur in any one of four ways:

1. A competing supplier may be able to obtain resources at lower prices.
2. A competing supplier may be able to consume fewer resources to make the product.
3. A competing supplier may accept a lower profit rate.
4. The incumbent may reduce his offer (for any of the above reasons).

The extent to which a case history displays a reduction in offered price with the advent of competition depends on a number of characteristics associated with the program. These characteristics influence each cost category differently. The impact of incremental start-up costs on offered price depends on the level of these costs borne by the supplier and the production quantity

anticipated by the supplier. If the DoD funds directly some or all of these costs, they play no role in the price offer and instead should be treated on the Government cost side of the benefit/cost evaluation.

The profit rate implicit in the price offer is not influenced by program characteristics such as production quantities but does bear some relationship to the makeup of costs as between recurring and nonrecurring and perhaps direct and indirect costs. The acceptable profit rate is also probably influenced by risk factors such as the level of technology required and length of contract performance.

Any proposed alternative supplier will be aware of the apparent advantage of the incumbent, especially with respect to amortization of nonrecurring costs. In the effort to be competitive, therefore, the possible new supplier is likely to consider alternative production methods. The major benefit expected from price competition is this quest for innovative production techniques and resultant net savings.

The effect of recurring costs, both direct and indirect, on offered price is influenced by production quantities through so-called learning effects. Unit recurring costs are typically presumed to decline at a constant rate with increased production quantities. The rate of "learning" itself is usually specific to the type of item procured, with labor-intensive production having rapid cost improvement while automated production evidences slower rates of improvement.

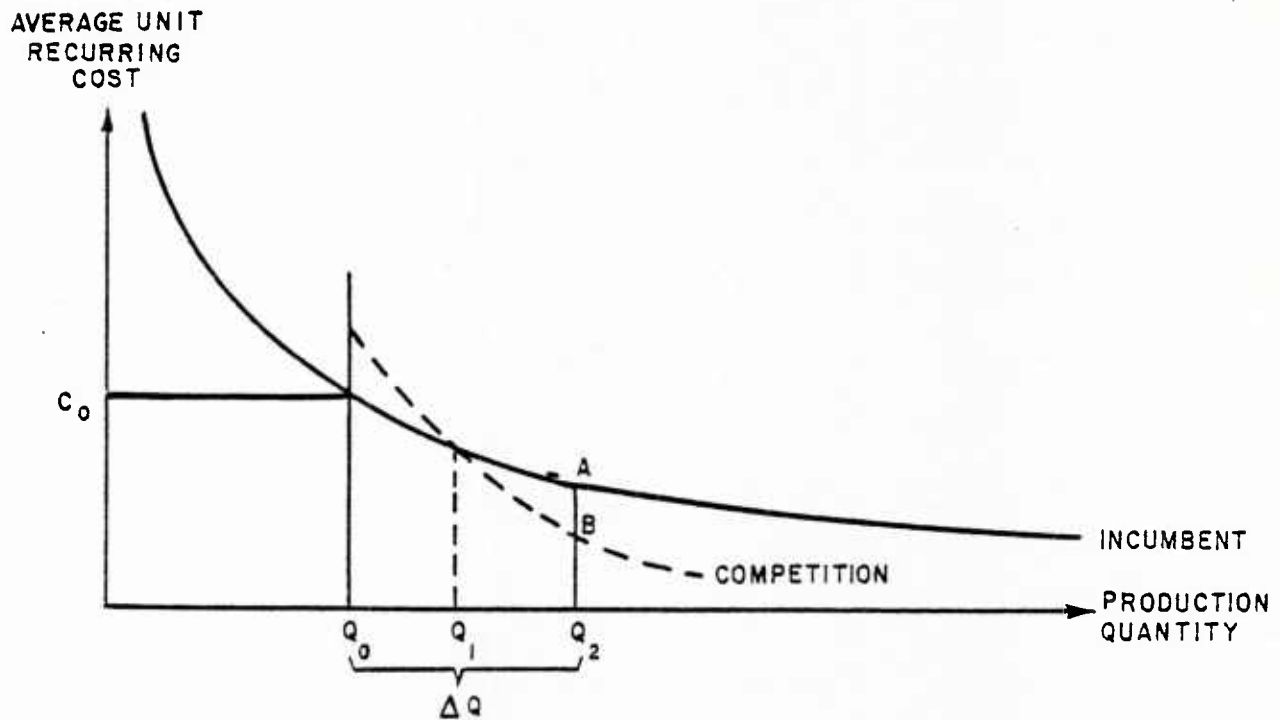
For past cases of noncompetitive awards subsequently subjected to price competition to be useful and reliable indicators of future competitive savings, results must be adjusted to reflect those characteristics which determine the extent of savings -- principally incremental start-up costs, quantities procured or anticipated, and the end-item type to reflect learning

and technical risks. The approach is to accept as attributable to the introduction of price competition the evidence on recurring cost savings and profit reduction, after adjustment for the influence of quantities on learning. The observed rates of savings can be applied to new programs. This requires case history data for which recurring costs plus profit can be separated from total price and production quantities before and after competition are known.

The accepted and correct technique is to project the incumbent's unit recurring costs based on either the learning rate experienced during recurrent noncompetitive buys or the learning rates experienced for comparable items in other DoD applications. This construct presumes a lowering of unit recurring cost if the incumbent's production had continued. It contrasts with the approach of using the last noncompetitive unit cost as the baseline against which competitive unit recurring costs are compared. An acceptable variation from the technique of comparing projected noncompetitive recurring costs to those observed with competition is to allow for different rates of learning with and without competition when the data support such differences. Figure A-1 illustrates the comparison of unit recurring costs before and after the introduction of competition.

An initial quantity Q_0 is procured from the incumbent with the non-competitive average unit cost at C_0 . Procuring an additional quantity $\Delta Q = Q_2 - Q_0$ from the incumbent results in continued progress down his learning curve. If, instead, competition is introduced, lower unit recurring costs are achieved for production quantities beyond Q_1 . The savings in recurring costs for competitively procured production quantity ΔQ , is given by the distance AB. The expected gross saving is this reduction in recurring unit cost times the quantity, ΔQ .

FIGURE A-1. AVERAGE UNIT RECURRING COSTS:
EFFECT OF COMPETITION



Evidence on the extent to which acceptable profit rates fall with the introduction of competition is generally not available. Noncompetitive profit rates are negotiated using weighted guidelines which recognize allowable costs incurred, risk, and capital employed as factors in the determination of profit. Identification of profit rates with competition requires separate cost breakouts which are sometimes unavailable.

The final cost element, nonrecurring start-up costs which are unique to and identifiable to a program, requires a different treatment. These costs can be expected to be quite different from program to program and possibly from contractor to contractor in the same program. Their effect on the competitive price offer depends not only on their magnitude but also on the production quantities over which they are amortized. The supplier can have

expectations for sales beyond the level being procured and may amortize non-recurring costs over volumes greater than being solicited by the DoD. The proper treatment of nonrecurring costs for purposes of forecasting likely competitive savings is to compute the estimated unit nonrecurring costs borne by the contractor using a capital recovery factor applicable to the length of the contract and prevailing interest rate. A start-up cost borne directly by the Government should be included as costs incurred for competition.

Cost categories to be included in the evaluation of the costs of competition also depend largely on the particular situation encountered. As a minimum, they include Government administrative costs for competition, bid and proposal costs included in contractor overhead rates, and the costs for the transfer of technology such as technical assistance and production cost differences between an incumbent and second source for learning buys.

Other types of costs may or may not be present depending on circumstances. If more total production capability is needed, incremental start-up costs would be present with or without a competitive second source and should not be attributable to competition. If the incumbent wins the price competition, duplicate costs for program-unique facilities to be provided by the Government do not occur. We have summarized the cost categories to be considered and the situations under which they are applicable in Table A-1. The cost categories are as inclusive as possible and are intended to cover most situations likely to be encountered in the DoD environment.

EVIDENCE

There are a multitude of relatively recent studies undertaken to quantify the extent of savings from competition of formerly noncompetitive awards. The objective of these studies is to utilize the available evidence to enable prediction of savings on future, perhaps dissimilar, programs. We have reviewed

TABLE A-1. INCREMENTAL COST CATEGORIES FOR BENEFIT/COST EVALUATION

1. Contingent liability to losing incumbent if Government has guaranteed buy-back of undepreciated facilities.
2. Duplication of any unique facilities and special test equipment provided by the Government to losing incumbent and new source.
3. Higher overhead costs on losing incumbent's other Government programs (including facilities depreciation).
4. Economic costs (not incurred by DoD but by society at large) for idle facilities of the losing incumbent, to the extent they are not recovered through other concurrent Government work (3 above).
5. None of the above if GOCO contract competed.
6. Implicit cost of time delay and risk of nonperformance and claims.
7. None of the above if incumbent wins competition.
8. None of the above if more total capacity needed.
9. Costs of technology transfer:
 - learning buy (production cost different between incumbent and new source)
 - cost of data package if incremental to competition
 - Government costs for reverse engineering
 - payment to incumbent to provide technical assistance to new supplier
 - Government-funded R&D or other assistance to second source
10. Bid and Proposal costs for unsuccessful competitors:
 - if funded by Government as allowable overhead item
 - if loser has no Government contracts, included as a social cost
11. Administrative costs to Government to obtain competition:
 - in-house technical resources to verify TDP
 - resources to administer and evaluate proposals
 - in-house efforts to assist with technology transfer

published studies to assess their usefulness in this regard. Specifically, observed savings can be extrapolated to new programs only after proper consideration of characteristics which drive the level of savings. In many cases faulty methodologies or data deficiencies diminish the usefulness of these studies. In other instances findings are useful, but only for new programs or awards with characteristics that are similar to the case from which the evidence was drawn.

There are a number of limiting examples which aid in the evaluation of the studies. Consider the procurement of items with little or no incremental start-up costs (to contractors or the Government). Examples are relatively simple spare parts items produced on general purpose equipment. Evidence on pre- and post-competitive price is equivalent to recurring cost plus profits since nonrecurring costs are largely absent. After adjustment for the quantity of production to capture learning effects, studies which compare prices use valid methodologies.

At the other extreme are awards where the Government funds all start-up costs. Again price comparisons are equivalent to recurring cost-plus-profit comparisons and need only be adjusted for quantity-induced learning effects. Government-funded start-up costs then should be treated on the cost side of the benefit/cost evaluation.

Any other cases where recurring costs, nonrecurring costs and profit are embedded in price, necessarily require the separation of nonrecurring costs from offered price and adjustment of nonrecurring costs for quantities of production. Otherwise the extrapolation of savings based on comparison of noncompetitive and competitive prices is conceptually incorrect.

We next review the major studies of savings from competitive repurchases concentrating on methodology used and findings determined.

ECOM 72

U.S. Army Electronics Command, Cost Analysis Division, Comptroller,
The Cost Effects of Sole Source vs Competitive Procurement, February
1972.

This early study attempted to develop a predictive model to forecast unit-price reductions from competitive reprocurements using experience from 22 competitive electronic items purchased by the Army. No attempt was made to use learning to estimate noncompetitive price but instead the last price prior to competition was used. Price on the first competitive buy was used to calculate benefits since nearly all competitive buys were "buy-outs." Inflation was not considered. Items considered were mainly radio sets, test sets, and related equipment with post-competitive prices between several hundred dollars and \$10,000 per unit.

From the sample of 22 potential cases, 13 cases were documented sufficiently so that predictive analysis could be performed. These 13 cases evidenced unit-price savings from competition that averaged 53 percent. To predict competitive savings, regression analysis was employed on the 13 sample cases using noncompetitive and competitive lead times, quantities and monthly production rates as possible explanatory variables. These regressions proved unsuccessful in developing a predictive model.

The study concluded that substantial reductions in unit price resulted from the introduction of competition, with a range of 25 to 30 percent a conservative estimate for planning purposes. These conclusions should be modified since the mean savings in unit-price (53 percent) did not consider learning to determine an estimate of the incumbent's price, and since the items considered were of low unit prices. No attempt was made to consider the timing of costs and benefits, and costs incurred by the Government for competition were also not considered. The results are of little use since

comparisons of the effects of competition were based on price and since quantity effects through learning were ignored.

Institute for Defense Analyses Studies

- Zusan, M., et al. "A Quantitative Examination of Cost-Quantity Relationships During Reprocurement, March 1974.
- Daly, G.; Gates, H.; and Schuttinga, J. The Effect of Price Competition on Weapon Systems Acquisition Cost, September 1979.

The 1974 IDA study employed data from 20 competitive reprocurements that evidenced two or more noncompetitive awards, at least one competitive award, and unit costs over \$1,000. Most items were procured by the Army and consisted of low unit price electronic items and missiles. With the exception of one \$87,000 item, unit prices on the first competitive buy ranged from \$1,000 to \$7,000 in constant 1970 dollars.

Adjustments were made for inflation and an expected noncompetitive price based on learning was computed. This price was compared to that on the first competitive buy -- generally a buy-out but in some instances a split award. Unit price reductions were found to average 36.8 percent with median savings of about 40 percent. Again, unit price was used as the basis for comparison, and recurring costs were not separated from nonrecurring costs, so the usefulness of the findings is questionable.

The 1979 IDA study employed data collected from the ECOM 72, the previous IDA 74 studies, and an Army Procurement Research Office 1978 study (discussed below). Price rather than recurring cost was used as the basis of comparison in these studies. A total of 31 cases were used, representing relatively low unit cost items, generally under \$10,000 at the end of noncompetitive production.

Savings calculation used a projected noncompetitive price based on learning. The Government costs of learning buys were netted out of savings.

Mean savings of 35 percent were found. No discounting of costs and savings was attempted.

Both IDA studies attempted to develop predictive models of savings using regression analysis. The early study employed the slope of the incumbent's learning curve, competitive and noncompetitive quantities, the type of competition and the number of bidders as possible explanatory variables. The last variable was not statistically significant. Savings were found to decrease with split awards, steep learning curves, and relatively low competitive quantities. Although these variables proved statistically significant, no endorsement of the model as a predictive tool was offered.

The second IDA study attempted first to measure the slope of the competitive learning curve which would be embodied in a predictive equation of savings. Gross saving from competition was determined as a function of the ratio of total to noncompetitive quantities, the slope of the incumbent's learning curve and the prior estimate of the slope of the competitive learning curve. The latter relationship (competitive learning curve slope as a function of incumbent's learning curve slope) proved unreliable and the sample mean competitive slope was used instead. IDA did not report explicitly the significance of the explanatory variables used as predictors of savings. They concluded, however, that savings increase when competitive quantities increase relative to noncompetitive quantities. Savings, not unexpectedly, are found to be independent of unit price and to decrease with steeper learning slopes.

Army Procurement Research Office Studies

- Lovett, E.T., and Norton, M.G., Determining and Forecasting Savings from Competing Previously Sole-Source/Noncompetitive Contracts, APRO 709-3, October 1978.
- Brannon, R. C., et al., Forecasting Savings From Repetitive Competition with Multiple Awards, presented at Annapolis, APRO 807, November 1979.
- Smith, C. H. and Lowe, C. M., Sole Source and Competitive Price Trends in Spare Parts Acquisition, Research Paper P-5, April 1981.

The earliest APRO study in 1978 used data from 16 Army and Navy systems to estimate net savings from competition and to develop a predictive model. Items included were missiles, radios, and torpedoes. Five of the cases had been employed in earlier studies. In some instances learning curves were estimated based on recurring cost data. In other cases separation of costs between recurring and nonrecurring apparently was not possible because they were not reported in the study documentation. Savings were determined by subtracting certain costs of competition -- technical assistance from the incumbent, learning buys and claims against the Government by the second source. In three of the cases, the first selected second-source failed to perform and the contract was terminated. Savings were calculated over all quantities procured competitively rather than just on the first competitive buy. Net savings, not discounted, as a percentage of total procurement costs averaged 10.8 percent. Gross unit price reductions averaged 13.7 percent but these results were quite dispersed, ranging from +52.8 percent to a low of -29.4 percent.

The predictive model employed used expected noncompetitive price and the ratio of competitive to total quantity to predict competitive price. The authors report finding that competitive price is less, the greater is the ratio of competitive to total quantities. The statistical significance of this result was not reported.

The second APRO study (by Brannon et al.) differed in several important respects from the others reported. The study considers the possibility of multiple awards for Army ammunition contracts covering bombs, fuzes, projectiles, cartridge cases, warheads, and other related items. A sample of 22 acquisitions was selected, and nonrecurring costs were subtracted from price in all instances. An adjustment was also made for

inflation, and noncompetitive price was projected on the basis of presumed learning rates. Average savings were determined as a function of learning rates: savings of 3.7, 7.1 and 10 percent corresponded to presumed learning curve slopes of 90, 95, and 100 percent (no learning), respectively.

To predict savings, a regression model was formulated and tested on the data base. Variables considered were the number of times the item was previously bought, the number of incumbent contractors, the number of contractors after the award was made, competitive pressure (defined as the number of contractors before divided by the number after competition), and quantity awarded. None of these variables was significant in explaining the observed savings.

The final APRO study (by Smith and Lowe) considered helicopter spare parts procured by the U.S. Army Troop Support and Aviation Readiness Command. A new and relatively clean data base was assembled consisting of 26 items procured at least three times noncompetitively followed by at least three competitive purchases. These items were subject to frequent buys, a fact which minimized the distortion from inflation. Item unit prices were low, ranging from a few dollars to several hundred dollars. The authors did not report on separation of recurring from nonrecurring costs or indeed whether significant start-up costs are present for these items.

Smith and Lowe performed two tests of the data. The first test rejected the hypothesis of difference between noncompetitive and competitive learning slopes. The second test confirmed that savings resulted from the introduction of competition. This test used projected incumbent's price based on learning compared to the actual competitive price on the first competitive buy. Savings were found not to depend on quantity bought. The median rate of savings was found at 24.3 percent for the first competitive buy with a 95 percent confidence interval of 3.4 to 37.3 percent.

SUMMARY

To predict the likely savings from the introduction of competition in production based on previous experience, we have concluded that nonrecurring start-up costs either must not be present or must be separated from recurring costs and profit. Recurring cost savings adjusted for the quantity of production then can be used as a guide to expected gross savings. Net savings can be calculated by subtracting nonrecurring costs and Government-incurred costs.

Programs which evidence competitive savings are by their very nature those most susceptible to competition. These programs are characterized by relatively easy technological transfer, an industrial infrastructure that has the capability to produce with small incremental investment, and Government volume requirements which justify the private start-up costs entailed by competition. For programs of this nature, gross savings from competition of the magnitude found in the literature should be expected. For other programs it is not reasonable to expect comparable gross savings. Government costs, both in type and magnitude, will also differ by program. There is a danger of extrapolation of results, however believable, to programs with dissimilar characteristics to those from which results are drawn. In particular, the observed competitive price reflects incremental start-up and investment costs of a new source as well as recurring costs of production. The ability to conduct a meaningful and viable competition between an incumbent and potential new entrants requires that incremental start-up and investment costs be low relative to total incurred costs -- a situation that does not always prevail.

Those studies which separately analyzed recurring cost savings, namely, the most recent APRO studies, evidenced relatively modest savings in the range of 5-to-15 percent for low value items like radios, missiles and components and 15-to-30 percent for aviation spare parts. No evidence exists

for programs with high incremental investment (i.e., nonrecurring start-up) costs, such as tanks, most combatant ships and aircraft, precisely because these programs have characteristics that are least amenable to competitive savings. Absent case histories in these items, the use of recurring cost savings of the magnitude reported in case studies when netted out by non-recurring costs and Government costs may not produce cost-effective competitive savings.

APPENDIX B

REPORTING SYSTEM

Detailed information on DoD prime contract awards is compiled and reported in the Procurement Management Reporting System. Reporting coverage, definitions and conventions are prescribed in DAR Section XXI and are compatible with the Federal Procurement Data System. The DoD system depends on information supplied by the many DoD contracting offices in two reports. Actions of \$10,000 or less are reported in an aggregated format on Monthly Procurement Summaries (DD Form 1057s), prepared by each contracting office. Individual Procurement Action Reports (DD Form 350s) are prepared for each contracting action in excess of \$10,000. (Exceptions are provided for certain unusual situations.)

The information summarized for actions of \$10,000 or less is available in considerable detail. Each reporting location summarizes, in terms both of numbers of actions and of dollar amounts, the total awards to each major category of contractor (large business, small business, educational and non-profit, outside the U.S., intragovernmental, and foreign military sales). The report shows the shares negotiated and awarded as a result of formal advertising. The report includes analysis of the use of the various statutory authorities for negotiation and information regarding the extent of competition, special categories of contractors (women-owned, small disadvantaged), and research and development. The summary reporting system deals with the vast majority of contract actions (over 12 million in 1981 out of a total less than 13 million).

The relatively few actions in excess of \$10,000 represent the vast majority of the dollar amounts (91% in 1980 and 97% in 1981). The individual procurement action reporting system supplies a tremendous amount of information about each of these actions. Each report identifies the nature of the product or service being acquired and the DoD program involved. It also identifies and describes the contractor and the process which led to the award, including such matters as synopsis in the Commerce Business Daily, the use of formal advertising or the reason for negotiation. It deals with preferences for labor surplus area contractors and for small business concerns. Each report describes the contract action, whether an original award or an amendment, and identifies the contract pricing technique. Other information is also supplied on each report. These individual action reports are available in the DoD Directorate for Operations and Reports, where recurring and special reports are prepared. The data base is used for the DoD Socio-Economic Program and for other acquisition policy and management control purposes.

SYSTEMATIC REPORTING ISSUES

Issues concerning reporting definitions and conventions which impact on competitive statistics were encountered in this study. Some of them are discussed in the following paragraphs.

Treatment of Subcontracts

An individual action report (DD Form 350) is submitted for the award of a prime contract for a large and complex weapon system. The dollar amounts devoted to subcontracts awarded by the prime are included in the prime award and thus appear to have the same competitive status as the prime award. If the prime contract is awarded on a basis other than price competition, the full amount will appear in DoD reports as "noncompetitive." As a corollary,

dollar amounts related to noncompetitive subcontracts are included as competitive when they occur under competitive prime awards.

Major prime contractors tend to be managers, assemblers, and integrators. They usually spend a large portion of the total contract price in subcontracts for components and the acquisition of materials from outside vendors. The Government, under the provisions of Part 1, DAR Section XXIII, reviews contractors' procurement systems. Where price competition is appropriate in subcontracting, it is presumably obtained by the prime contractor using an approved system. The benefits of (lower) prices obtained from competition conducted by the prime contractor are typically expected and therefore considered in the contract pricing action between the Government and the prime. The reporting system thus fails to give "credit" for competitive prices which may be of benefit to the Government.

There are no easy solutions to the issue associated with subcontract reporting. To report the competitive status of subcontracts would introduce many difficult questions. Principally, who would do the reporting, prime contractor or Government, under what rules and at what annual administrative cost? This information may be useful in relation to any one contract award, but the utility of an aggregate report for the DoD is not obvious.

Catalog or Market Price

Item 18 on the Individual Procurement Action Report (DD Form 350) deals with "Extent of Competition in Negotiation." Code 6 in this item is used, under the terms of DAR 21-26(g)(6), to report "noncompetitive actions based on established catalog or market prices...." The instruction defines the actions as noncompetitive, and they are so reported in DoD summaries. This treatment is surely correct for some situations, where the catalog price

is only a reference point from which actual prices are to be negotiated. Under other circumstances, perhaps more common, contracts are awarded at market prices, which prices were indeed established by the forces of competition. The reporting system gives no recognition to this competitive benefit.

Follow-On Contracts

Suggestions are often made to identify as competitive, contracts negotiated as follow-ons to competitive initial awards. For example, the OFPP, in its February 26, 1982 proposal for a Uniform Federal Procurement System suggested (on its page 34) a special category for follow-on to competition.

The DD Form 350 provides for identification of follow-on awards, but they are summarized as noncompetitive. In the strict sense this interpretation is correct. The award is negotiated on a noncompetitive basis with the incumbent contractor. However, negotiation proceeds from a cost baseline which was established by competition and some, if not all, of the benefits flow through to the subsequent follow-on reprocurement. We, therefore, subscribe to the recommendation that awards negotiated as follow-on to originally price competitive actions be given separate reporting status.

Contract Modifications

Item 14 of the DD Form 350 identifies the kind of contract action being reported. Here actions which represent engineering or specification changes and additional work are identified. Such contract actions, however, are, in accordance with DAR 21-126(h) reported, as to extent of competition, the same as the basic contract to which they apply. Contract modifications have some of the attributes of sole-source contracting. Under some circumstances the reporting system may suggest more competition than was in fact obtained.

Split Awards

The Statutory Exemption of 10 U.S.C. 2304(a)(16) for Industrial Mobilization was used for \$2.85 billion in 1980 and \$4.06 billion in 1981. Not all of these amounts, but a large part of them, were involved in split awards, where two or more sources vie for shares of the DoD's total requirement. The high price bidder is assured of some share of the total award. In such awards the DoD keeps the multiple sources available for mobilization (and perhaps to some extent also for the future ability to obtain competition, not in itself an allowable reason for negotiation), and the contractors know that there will be some award to each. Even so there is some competition. We believe the reports should show this competitive aspect as a separate category.

Coverage of Requirements

For commercial grades of refined petroleum products, the DoD is a relatively minor part of the total market. Fuel purchases have become a significant part of the DoD procurement budget due to escalating world crude oil prices, a significant cost component of the refined petroleum products bought by the DoD. Suppliers consider the Defense Fuel Supply Center as one of many potential buyers. Before the crude oil shortages and price increases for crude oil, refined products were procured through formal advertising procedures. More recently, acquisition is often negotiated from proposals submitted in response to Government requests. Those proposals which are outside a competitive range of market prices are considered nonresponsive, as are those where the bidder refuses to comply with standard contract clauses. In general, if "responsive" offers amount to as much as 120 percent of the total DoD requirement, the resulting contracts are classed as "price competitive." If, however, offers are not that high a share of the total

requirement, the resulting awards are classed as noncompetitive, even though each of the responsive suppliers performed in the same way under both sets of circumstances. We disagree with the use of "coverage" as a proxy for competition.

BETTER USE OF THE REPORTING SYSTEM

Reporting and tracking of overall DoD awards and methods of contract placement is an ongoing OSD responsibility. This is accomplished through the Procurement Management Reporting System using information forwarded to OSD by DoD purchasing activities worldwide. Better use could be made of this existing system in two ways: to pinpoint emerging problems and to identify instances where the overall rate of competition is below attainable levels. These uses are called trend analysis and comparability assessment, respectively.

Trend Analysis

The overall rate of price competition achieved by the DoD is usually judged by reference to historic accomplishments. The contemporaneous rate of price competition can be higher or lower than an historic norm or average depending on two influences: changes in the mix of goods and services procured either towards or away from items traditionally procured through price competition and changes (up or down) in the rate of price competition by item. LMI has previously performed such an analysis of trends and identified causes of changes in the apparent overall rate of price competition as between changes in the budget mix and changes in the level of competition for particular items.¹ The change in the actual overall rate of price competition (defined as the measured rate adjusted for changes in the mix of items

¹White, R. P. and Myers, M. G., "Competition in DoD Acquisitions," LMI Task RE907, May 1979.

procured) can usually be attributed to a reasonably small number of high dollar categories experiencing declining rates of competition. Review by OSD with the cognizant procuring activities can determine causes and appropriate action can be undertaken.

Comparability Analysis

Another OSD use of the available procurement reporting system involves the construction of indices of price competition by purchasing activity. Purchasing activities typically procure items identified by a host of four-digit Federal Supply Codes. It appears reasonable to judge the competitive accomplishment of a particular activity based on its achieved rate of competition compared to the overall DoD average for items bought. This can be accomplished by constructing an index number using the percentage of dollars represented by each FSC code as weights and the ratio of activities' percentage price competitive to the DoD overall rate for each item. An index number of unity conforms to parity with the overall DoD rate while an index greater than unity represents a higher rate of price competition than average achievement. Offices with extremely high and low scores could then be contacted to ascertain the reasons. Perhaps new or innovative techniques used to achieve above-average rates of price competition can be applied elsewhere. Failure to obtain price competition at rates obtained elsewhere for similar goods and services may indicate failure to apply appropriate policies.